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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,247	08/27/2001	Takamasa Ito	NEC 2360	6115

7590 01/29/2003  
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EXAMINER
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VINH, LAN

ART UNIT	PAPER NUMBER
1765	3

DATE MAILED: 01/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/940,247

Applicant(s)

ITO, TAKAMASA

Examiner

Lan Vinh

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 27 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☐ Claim(s) 1 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1) ☐ Certified copies of the priority documents have been received.  
2) ☒ Certified copies of the priority documents have been received in Application No. 09/940,247.  
3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Information Disclosure Statement*

1. The Information Disclosure Statement (IDS) filed on 8/27/2001 has been considered. The PTO form 1499 is enclosed in this office action.

### *Drawings*

2. The drawings are objected to because in box S2 of fig. 5, the term "heat treting" appears to be a typographical error, the examiner suggests replacing "heat treting" with -heat treating-. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suguro (US 6,033,537) in view of Lee et al (US 6,074,960 )

Suguro discloses a method for manufacturing a semiconductor device (MOS transistor ), the MOS transistor having a self-aligned metal silicide layer 20 on a

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source/drain region 18 and gate electrode 14 formed on a semiconductor substrate 11 (col 10, lines 40-43; fig. 8E). This method comprises the steps of:

completely covering the substrate 11 with gate electrode 14 with a cobalt film 19 (col 10, lines 22-23; fig. 8D), which reads on depositing a cobalt film over an entire surface of the semiconductor device formed on the semiconductor substrate

annealing/heat treating the cobalt film 19 at 500-600<sup>0</sup> C to form cobalt silicide layer 20 on the gate electrode and the source/drain region 18 (col 10, lines 37-42 )

removing/etching away the unreacted cobalt film 19 remaining on the semiconductor substrate using an etching solution containing hydrochloric acid, hydrogen peroxide and water (col 11, lines 13-19 )

Unlike the instant claimed invention as per claim 1, Suguro fails to explicitly specify a concentration of hydrochloric acid, hydrogen peroxide and water in the range of 1:1:5 to 3:1:5, a solution temperature of 25-45<sup>0</sup> C and an etching time of 1-20 minutes.

However, Lee discloses a method for selectively etching against cobalt comprises the step of removing/etching away the unreacted cobalt film using an etching solution containing hydrochloric acid, hydrogen peroxide and water having a concentration of 1:1:5 (col 6, lines 20-45; col 8, lines 40-43 ), the etching is carried out at a temperature of 20-100<sup>0</sup> (col 5, lines 63-64 ), which overlaps the claimed range of 25-45<sup>0</sup> C. Lee also discloses that the thickness of the cobalt layer is 1000 angstroms (col 3, lines 65-66 ) and the etching solution etches unreacted cobalt at a rate of 1000angstrom/minute (col 6, lines 8-10 ), which is interpreted by the examiner as performing the etching step in 1 minute. In addition, Lee also discloses that the etching

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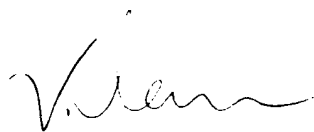
rate of cobalt changes/varies as the concentration of the etching solution changes (col 7, lines 22-42 ) and the etching rate of cobalt also changes depending on the soaking time/etching time and temperature (col 7, lines 46-48)

Thus, Lee serves as evidence that the concentration of the etchants in the etching solution, the temperature of the etching solution and etching time are so-called "result effective variable". It has been held that the discovery of an optimum value for result effective variables is within the purview of routine experimentation by the person of ordinary skill in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980 )

### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 703 305-6302. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872-9310 for regular communications and 703 872-9311 for After Final communications.



LV

January 21, 2003